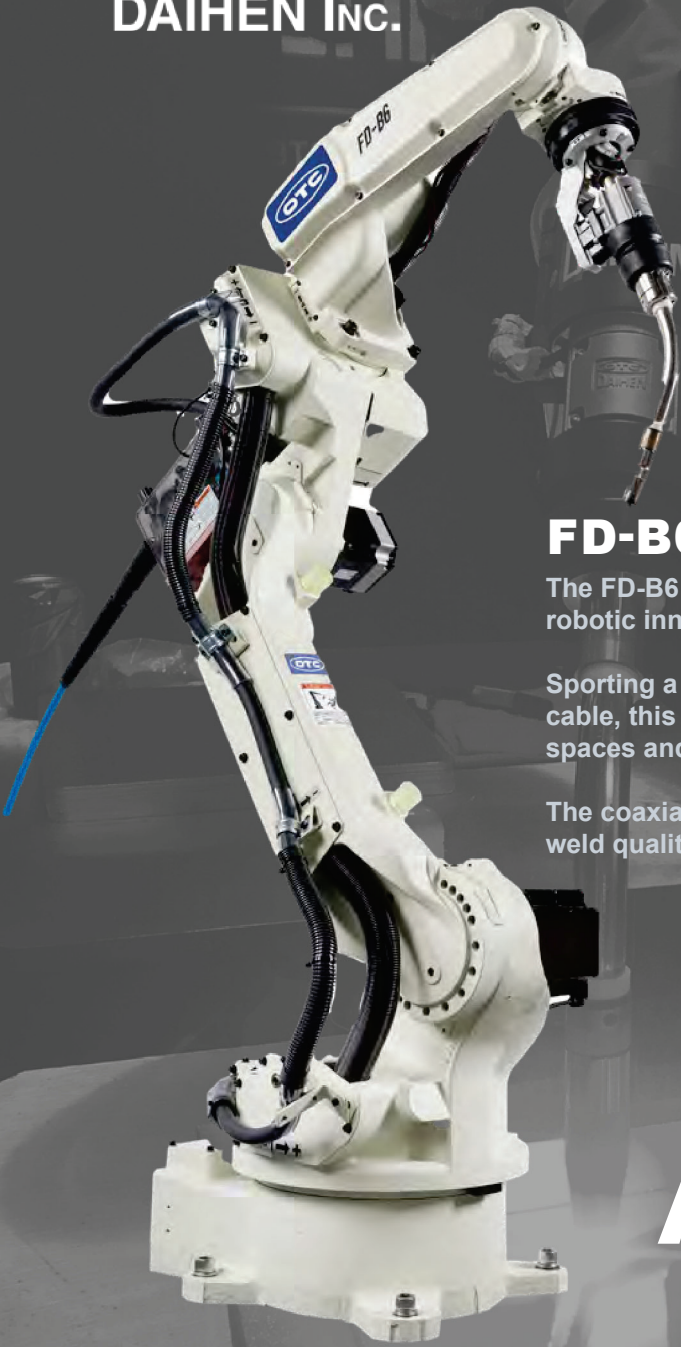




DAIHEN INC.

**FD** *Friendly series*



## **FD-B6**

The FD-B6 arc welding robot represents the newest in robotic innovations.

Sporting a unique design with a through-arm coaxial cable, this robot is highly versatile at welding in confined spaces and complicated fixtures.

The coaxial cable of the FD-B6 also helps improve overall weld quality.

**COMPLETE  
ROBOTIC  
ARC WELDING  
SYSTEMS**

[WWW.DAIHEN-USA.COM](http://WWW.DAIHEN-USA.COM)

# THE IDEAL SOLUTION FOR AUTOMATION OF WELDING



**FD-V25L**

**FD-V80**

**FD-V100**

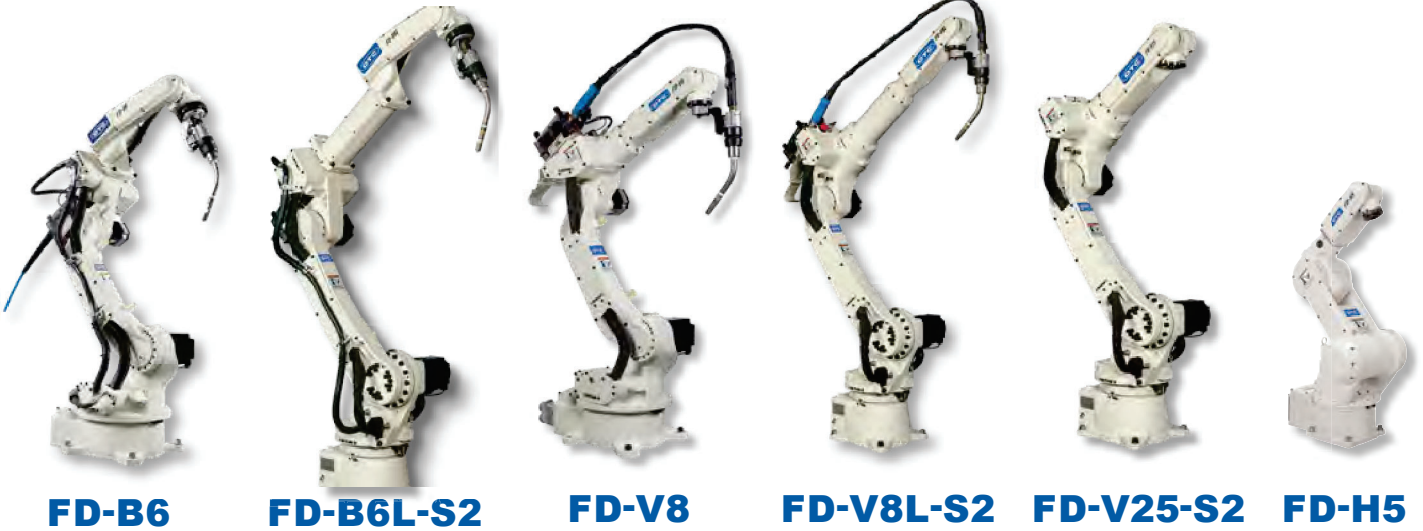
**FD-V130**

**FD-B100**

# CHANGING THE FUTURE OF MANUFACTURING

## OPTIMUM TEACHING

Easy teaching, even for a two-electrode torch



Our arc welding robots are ideal for many welding and air plasma cutting applications. They can be used for mild steel, stainless steel, aluminum, titanium and other exotic metals. While some models feature a compact design, robots can handle a variety of jobs ranging from small to large in size.

All robots include a FD21 robot controller and a teach pendant.



**Intuitive Operation**  
Touch panel and jog dial ensure easy operation.



**Quality Control Functions**  
Easy quantitative management of welding procedures.



**Compact and Eco-Friendly**  
Space-saving design with reduced standby power consumption.

# FD *Friendly series*



## SMOOTH OPERATION

### TEACH PENDANT

#### FD21 TEACH PENDANT

##### Redesigned for comfortable, extended use

- 66% less arm fatigue
- Weight reduced by 15%
- Grip redesigned with comfortable 3D contouring
- Easy-to-press keypad with lighter press force
- Keypad delivers tactile <click> feedback
- Raised features on keypad for tactile, “no-look” navigation
- Added two (2) quick-keys for HOME SCREEN and MENU for faster navigation
- Redesigned for reliability
- Weld-spatter-resistant border around touch-screen
- Pluggable teach pendant cable for rapid damaged cable replacement
- Hanger hook is now a replaceable, wear item
- Touch-screen upgraded
- Improved resolution and contrast
- Faster response
- Finer touch resolution
- Supports touch-screen only program editing
- Scroll with swiping action
- On-screen keypad for numeric entry
- Menu icons for tablet/phone-like operation



#### FD21 ROBOT CONTROLLER

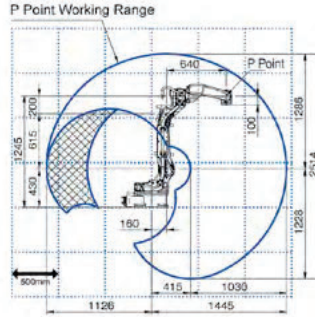
##### Versatility to “Connect” with facilities, devices and users.

- Easily “CONNECTS” with peripheral equipment through simplified system configuration
- “CONNECTS” from anywhere in the world
- Expanded motion control via “connectable” external axis unit
- Improved “Connectivity” for multiple robots and multiple auxiliary axes
- Enhance your system by “connecting” commercial peripherals
- Offline teaching “CONNECTS” you to uninterrupted production



# RANGE OF MOTION MANIPULATOR WORKING RANGE / SPECIFICATIONS

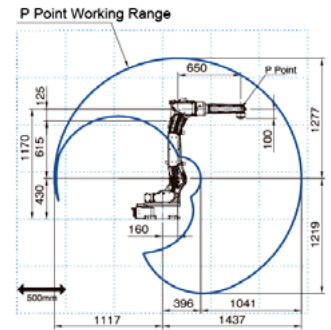
## FD-B6 Standard



Legend: Wall or ceiling mounted

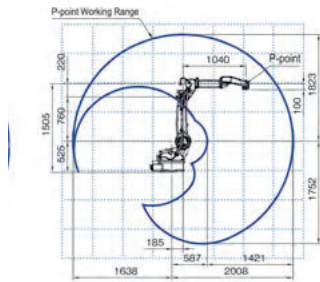
Reach	1445mm
Payload	6kg
Axes	6
Repeatability	± 0.08mm

## FD-V8 Standard



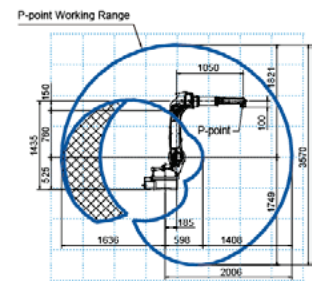
Reach	1437mm
Payload	8kg
Axes	6
Repeatability	± 0.08mm

## FD-B6L-S2 Long Reach



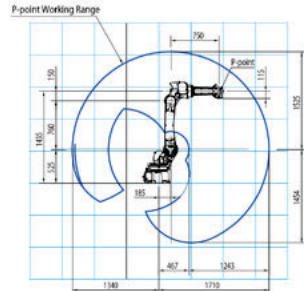
Reach	2008mm
Payload	6kg
Axes	6
Repeatability	± 0.05mm

## FD-V8L-S2 Long Reach



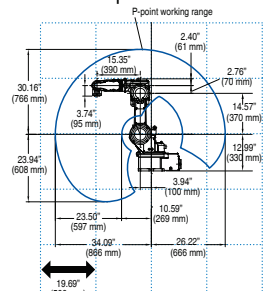
Reach	2006mm
Payload	8kg
Axes	6
Repeatability	± 0.05mm

## FD-V25-S2 Standard



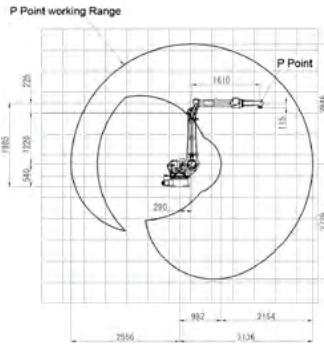
Reach	1710mm
Payload	25kg
Axes	6
Repeatability	± 0.04mm

## FD-H5 Compact



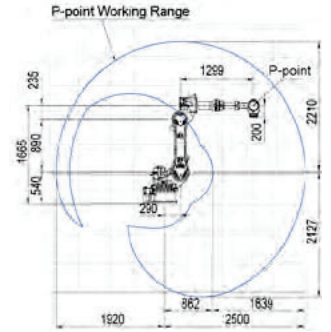
Reach	866mm
Payload	5kg
Axes	6
Repeatability	± 0.05mm

### FD-V25L



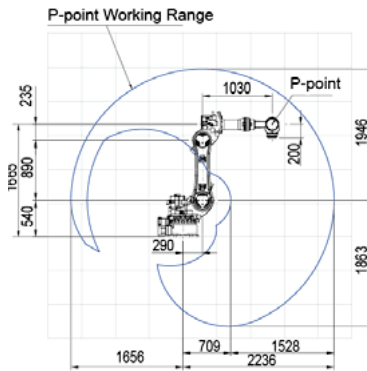
Reach	3136mm
Payload	25kg
Axes	6
Repeatability	± 0.07mm

### FD-V80



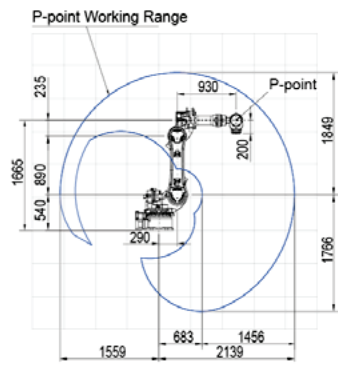
Reach	2501mm
Payload	80kg
Axes	6
Repeatability	± 0.08mm

### FD-V100



Reach	2236mm
Payload	100kg
Axes	6
Repeatability	± 0.08mm

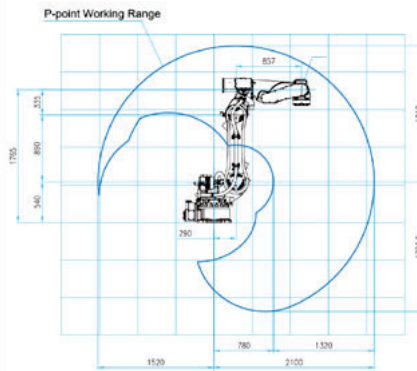
### FD-V130



Reach	2139mm
Payload	130kg
Axes	6
Repeatability	± 0.08mm



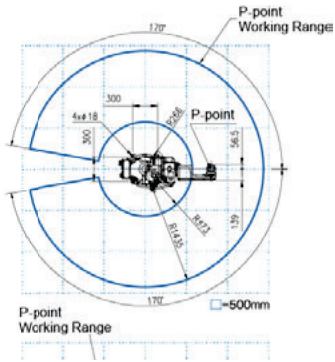
### FD-B100



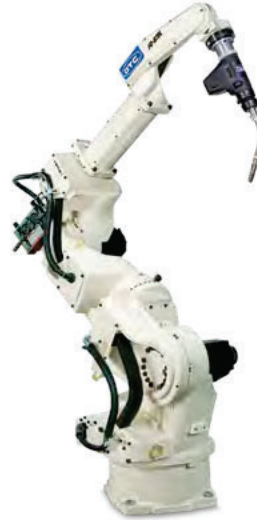
Reach	2100mm
Payload	100kg
Axes	6
Repeatability	± 0.06mm



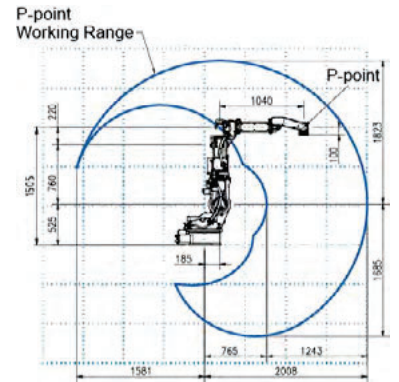
**FD-BT6**



Reach	1435mm
Payload	6kg
Axes	7
Repeatability	± 0.05mm



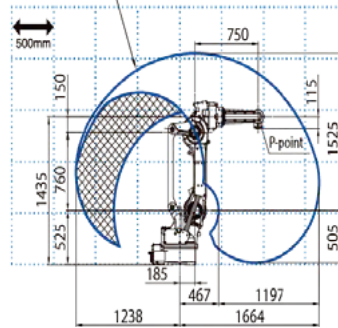
**FD-BT6L**



Reach	2008mm
Payload	6kg
Axes	7
Repeatability	± 0.06mm



**FD-A20**  
P-point Working Range



Reach	1664mm
Payload	20kg
Axes	6
Repeatability	± 0.07mm

# Specifications: Manipulator for 6 axis

FD-B6		FD-B6L-S2		FD-V8		FD-V8L-S2		FD-H5		FD-V25-S2	
Model	NB6	NB6L	NV8	NV8L	NH5	NV25					
Number of axes	6	6	6	6	6	6					
Maximum capacity	13.2 lbs (6kg)	13.2 lbs (6kg)	17.6 lbs (8kg)	17.6 lbs (8kg)	11.02 lbs (5kg)	44.09 lbs (25kg)					
Positional repeatability	±0.003" (±0.08mm) <sup>(1)</sup>	±0.002" (±0.05mm) <sup>(1)</sup>	±0.003" (±0.08mm) <sup>(1)</sup>	±0.002" (±0.05mm) <sup>(1)</sup>	±0.002" (±0.05mm) <sup>(1)</sup>	±0.002" (±0.04mm) <sup>(1)</sup>					
Horizontal Reach	56.88" (1445mm)	79.06" (2008mm)	56.58" (1437mm)	78.98" (2008mm)	34.09" (868mm)	67.32" (1710mm)					
Vertical Reach	98.98" (2514mm)	140.75" (3575mm)	98.27" (2496mm)	140.55" (3570mm)	54.1" (1374mm)	117.28" (2979mm)					
Driving capacity	3132 W	4632 W	3016 W	4800 W	1440 W	5400 W					
Arm	J1 (Rotation)	±170° (±50°) <sup>(2)</sup>	±170° (±50°) <sup>(2)</sup>	±170° (±50°) <sup>(2)</sup>	±170° (±50°) <sup>(2)</sup>	±170° (±50°) <sup>(2)</sup>					
	J2 (Lower arm)	-155° to +90° <sup>(3)</sup>	-155° to +90° <sup>(3)</sup>	-155° to +90° <sup>(3)</sup>	-125° to +90°	-155° to +100° <sup>(3)</sup>					
Wrist	J3 (Upper arm)	-170° to +190°	-170° to +190°	-170° to +190°	-140° to +245°	-170° to +260° <sup>(4)</sup>					
	J4 (Swing)	±155° (±170°) <sup>(5)</sup>	±155° (±170°) <sup>(5)</sup>	±180°	±180°	±190°					
Working Range	J5 (Bending)	-45° to +225° <sup>(6)</sup>	-45° to +225° <sup>(6)</sup>	-50° to +230°	-30° to +210°	-50° to +230°					
	J6 (Twist)	±205° (±360°) <sup>(6,7)</sup>	±205° (±360°) <sup>(6,7)</sup>	±360°	±360°	±360°					
Arm	J1 (Rotation)	4.19 rad/s (240°/s) (3.32 rad/s (175°/s)) <sup>(2)</sup>	3.93 rad/s (225°/s) (3.05 rad/s (175°/s)) <sup>(2)</sup>	4.19 rad/s (240°/s) (3.32 rad/s (190°/s)) <sup>(2)</sup>	3.49 rad/s (200°/s) (2.79 rad/s (160°/s)) <sup>(2)</sup>	3.93 rad/s (225°/s) (3.05 rad/s (175°/s)) <sup>(2)</sup>					
	J2 (Lower arm)	4.19 rad/s (240°/s)	3.58 rad/s (205°/s)	4.19 rad/s (240°/s)	3.49 rad/s (200°/s)	3.58 rad/s (205°/s)					
Motion speed	J3 (Upper arm)	4.01 rad/s (230°/s)	3.84 rad/s (220°/s)	4.01 rad/s (230°/s)	4.54 rad/s (260°/s)	4.45 rad/s (255°/s)					
	J4 (Swing)	7.50 rad/s (430°/s)	7.50 rad/s (430°/s)	7.50 rad/s (430°/s)	6.83 rad/s (380°/s)	7.85 rad/s (450°/s)					
Wrist	J5 (Bending)	7.50 rad/s (430°/s)	7.50 rad/s (430°/s)	7.50 rad/s (430°/s)	6.83 rad/s (380°/s)	7.85 rad/s (450°/s)					
	J6 (Twist)	11.00 rad/s (630°/s)	11.00 rad/s (630°/s)	11.00 rad/s (630°/s)	8.95 rad/s (510°/s)	10.60 rad/s (605°/s)					
Allowable moment	J4 (Swing)	10.5 N·m	10.5 N·m	17.6 N·m	11.9 N·m	52.6 N·m					
	J5 (Bending)	10.5 N·m	10.5 N·m	17.6 N·m	11.9 N·m	52.6 N·m					
Wrist allowable moment	J6 (Twist)	5.9 N·m	5.9 N·m	7.8 N·m	5.21 N·m	24.5 N·m					
	J4 (Swing)	0.28 kg·m <sup>2</sup>	0.28 kg·m <sup>2</sup>	0.43 kg·m <sup>2</sup>	0.303 kg·m <sup>2</sup>	1.24 kg·m <sup>2</sup>					
Wrist allowable moment of inertia	J5 (Bending)	0.28 kg·m <sup>2</sup>	0.28 kg·m <sup>2</sup>	0.43 kg·m <sup>2</sup>	0.303 kg·m <sup>2</sup>	1.24 kg·m <sup>2</sup>					
	J6 (Twist)	0.06 kg·m <sup>2</sup>	0.06 kg·m <sup>2</sup>	0.09 kg·m <sup>2</sup>	0.061 kg·m <sup>2</sup>	0.33 kg·m <sup>2</sup>					
Arm cross-sectional area	3.57 m <sup>2</sup> x 340°	6.37 m <sup>2</sup> x 340°	3.11 m <sup>2</sup> x 340°	7.48 m <sup>2</sup> x 340°	1.22 m <sup>2</sup> x 340°	5.27 m <sup>2</sup> x 340°					
Environmental conditions	32 to 113° F (0 to 45° C), 20 to 80% RH (no condensation)										
Mass / weight	320 lbs (145kg)	523 lbs (237kg)	309 lbs (140kg)	523 lbs (237kg)	128 lbs (58kg)	531 lbs (241kg)					
Maximum load of upper arm	22 lbs (10kg) <sup>(7)</sup>	44 lbs (20kg) <sup>(7)</sup>	22 lbs (10kg) <sup>(7)</sup>	44 lbs (20kg) <sup>(7)</sup>	2.2 lbs (1kg) <sup>(7)</sup>	22 lbs (10kg) <sup>(7)</sup>					
Installation method	Floor/Ceiling/Wall										
Paint color	White (Munsell notation 10GY 9/1)										

- NOTES:
- (1) The value of the positional repeatability is at the tool center point (TCP) in compliance with ISO 9283.
  - (2) The value in parentheses indicates wall mounted.
  - (3) Working range of the J2 axis is restricted by the position of the J1 axis.
  - (4) Working range of the J3 axis is restricted to -170° to +205° when floor based welding is applied.
  - (5) Working range of the J4 axis may be restricted by the position of the J5 axis.
  - (6) When loading, the maximum payload as the end effector.
  - (7) This value changes according to placement and load conditions of the wrist.
- Through-arm cable design improves torch reach & wire feeding
  - Offers a wide working range with an independently articulated arm
  - Seamless digital connection with all OTC DAIHEN brand welding power supplies
  - Improved vibration restraining control provides smooth robot movement
  - Built-in mechanical shock sensor
  - Single source technology – all components are manufactured by OTC DAIHEN
  - Highly versatile design supports most welding applications

These specifications are subject to change without prior notice.



# Specifications: Manipulator for 7-axis

			<i>FD-BT6</i>	<i>FD-BT6L</i>
Model			NBT6	NBT6L
Number of axes			7	7
Maximum capacity			13.2lb (6kg)	13.2lb (6kg)
Positional repeability			±0.0020in (±0.05mm) <sup>(1)</sup>	±0.0024in (±0.06mm) <sup>(1)</sup>
Horizontal Reach			56.50" (1435mm)	79.06"(2008mm)
Vertical Reach			96.30" (2446mm)	138011"(3508mm)
Driving capacity			4132W	5832W
Working Range	Arm	J1 (Rotation 1)	±170°	±170°
		J2 (Lower arm)	-145° to +70°	-145° to +70°
		J7(Rotation 2)	±90°	±90°
		J3 (Upper arm)	-170° to +142.6°	-170°~ +154°
	Wrist	J4 (Swing)	±155°	±155°
		J5 (Bending)	-45° to +225° <sup>(2)</sup>	-45° to +225° <sup>(2)</sup>
		J6 (Twist)	±205° <sup>(2)</sup>	±205° <sup>(2)</sup>
Motion speed	Arm	J1 (Rotation 1)	3.84 rad/s (220°/s)	3.93 rad/s (225°/s)
		J2 (Lower arm)	3.93 rad/s (225°/s)	3.49 rad/s (200°/s)
		J7(Rotation 2)	3.14rad/s (180°/s)	2.79 rad/s (160°/s)
		J3 (Upper arm)	4.01 rad/s (230°/s)	3.84 rad/s (220°/s)
	Wrist	J4 (Swing)	7.50 rad/s (430°/s)	7.50 rad/s (430°/s)
		J5 (Bending)	7.50 rad/s (430°/s)	7.33 rad/s (430°/s)
		J6 (Twist)	11.00 rad/s (630°/s)	10.5 rad/s (630°/s)
Wrist allowable load	Allowable moment	J4 (Swing)	10.5 N•m	10.5 N•m
		J5 (Bending)	10.5 N•m	10.5 N•m
		J6 (Twist)	5.9 N•m	5.9 N•m
	Allowable moment of inertia	J4 (Swing)	0.28 kg•m <sup>2</sup>	0.28 kg•m <sup>2</sup>
		J5 (Bending)	0.28kg•m <sup>2</sup>	0.28 kg•m <sup>2</sup>
		J6 (Twist)	0.06 kg•m <sup>2</sup>	0.06 kg•m <sup>2</sup>
Arm cross-sectional area			2.57 m <sup>2</sup> x 340°	5.28 m <sup>2</sup> x 340°
Environmental conditions			32 to 113° F (0 to 45° C), 20 to 80% RH (no condensation)	
Mass / weight			404 lb (183 kg)	719 lb (326 kg)
Maximum load of upper arm			22 lb (10kg) <sup>(3)</sup>	22 lb (10kg) <sup>(3)</sup>
Installation method			Floor	
Paint color			White (Munsell notation 10GY 9/1)	

Notes:

- (1) The value of the positional repeatability is at the tool center point (TCP) in compliance with ISO 9283.
- (2) There are occasions where restrictions can be made to the operation range of the J6 axis, depending on the J5 axis's posture.
- (3) When loading the Max. payload capacity as the end effector.

# ULTRA-FLEX Series

The ULTRA-FLEX SERIES arc welding robots are OTC DAIHEN's solution to avoid interference with the work and tooling without changing the position and/or attitude of the robot. Access to a proper welding position is possible without a positioner. The result is savings in space and costs compared to a conventional 6-axis system.

Five models available. A perfect robot for every application.



These specifications are subject to change without prior notice.

# Specifications: Manipulator for Long-Reach Series

		<i>FD-V25L</i>	<i>FD-B100</i>	<i>FD-V80</i>	<i>FD-V100</i>	<i>FD-V130</i>	
Model		NV25L	NB100	NV80	NV100	NV130	
Number of axes		6	6	6	6	6	
Maximum capacity		55.1lb (25kg)	220.5lb (100kg)	176.4lb (80kg)	220.5lb (100kg)	286.6lb (130kg)	
Positional repeatability		±0.003in (±0.07mm) <sup>(1)</sup>	±0.002in (±0.06mm) <sup>(1)</sup>	±0.003in (±0.08mm)			
Horizontal Reach		123.5in (3136mm)	82.7in (2100mm)	98.5in (2501mm)	88in (2236mm)	91.29in (2139mm)	
Vertical Reach		219.49in (5575mm)	139.2in (3,537mm)	170.8in (4339mm)	150in (3809mm)	142.3 in (3615mm)	
Driving capacity		15100W	16000W	15100W	15100W	15100W	
Working Range	Arm	J1 (Rotation)	±180°				
		J2 (Lower arm)	-155° to +90°				
		J3 (Upper arm)	-180°~+250°	-185°~+170°	-185° to +220°		
	Wrist	J4 (Swing)	±180°	±210°	±360°		
		J5 (Bending)	-50°~+230°	-35°~+215°	-35° to +215°		
		J6 (Twist)	±360° <sup>(2)</sup>	±210°	±360°		
Motion speed	Arm	J1 (Rotation)	3.39 rad/s {194°/s}	2.44 rad/s{140°/s}			
		J2 (Lower arm)	3.14 rad/s {180°/s}	1.92 rad/s {110°/s}			
		J3 (Upper arm)	4.58 rad/s {205°/s}	2.44 rad/s{140°/s}			
	Wrist	J4 (Swing)	7.85 rad/s {450°/s}	3.58 rad/s{205°/s}	3.05 rad/s (175°/s)		
		J5 (Bending)	7.68 rad/s {440°/s}	3.67 rad/s{210°/s}	3.05 rad/s (175°/s)		
		J6 (Twist)	10.56 rad/s {605°/s}	5.67 rad/s{325°/s}	4.45 rad/s (255°/s)		
Wrist allowable load	Allowable moment	J4 (Swing)	52.6N•m	650 N•m	433.0N•m	721.0N•m	
		J5 (Bending)	52.6N•m	650 N•m	433.0N•m	721.0N•m	
		J6 (Twist)	24.5N•m	294 N•m			
	Allowable moment of inertia	J4 (Swing)	2.7lb (1.24 kg)•m <sup>2</sup>	60kg•m <sup>2</sup>	31.4 kg•m <sup>2</sup>	60.0kg•m <sup>2</sup>	
		J5 (Bending)	2.7lb (1.24 kg)•m <sup>2</sup>	60kg•m <sup>2</sup>	31.4 kg•m <sup>2</sup>	60.0kg•m <sup>2</sup>	
		J6 (Twist)	0.7lb (0.33 kg)•m <sup>2</sup>	33.7kg•m <sup>2</sup>	11.9 kg•m <sup>2</sup>	33.7kg•m <sup>2</sup>	
Arm cross-sectional area		17.2 m <sup>2</sup> × 360°	6.21 m <sup>2</sup> × 360°	9.53m <sup>2</sup> x 360°	7.56m <sup>2</sup> x 360°	6.83m <sup>2</sup> x 360°	
Environmental conditions		32°F to 113°F (0 to 45°C), 20 to 80% RH (no condensation)					
Mass / weight		1367lb (620kg)	1748lb (793kg)	1731lb (785kg)	1698lb (770kg)	1687lb (765kg)	
Maximum load of upper arm		22lb (10kg) <sup>(3)</sup>	110lb (50kg) <sup>(3)</sup>	110lb (50kg) <sup>(3)</sup>			
Installation method		Floor/Ceiling					
Paint color		White (Munsell notation 10GY 9/1)					

NOTES:

- (1) The value of the positional repeatability is at the tool center point (TCP) in compliance with ISO 9283.
- (2) There are occasions where restrictions can be made to the operation range of the J6 axis, depending on the J5 axis' posture.
- (3) The upper arm movable mass changes depending on the wrist movable mass.

- Optimized for the speed, lifting capacity
- Slim wrist and upper arm
- Small mounting footprint
- DeviceNet
- Discrete I/O
- Pneumatic lines
- User application cable conduit (Robot base-to-shoulder routing included)

# Specifications: Manipulator for High Accuracy Robots

			FD-A20
Model			NA20
Number of axes			6
Maximum capacity			44.09 lbs (20kg)
Positional repeatability			±0.003" (±0.07mm) <sup>(1)</sup>
Horizontal Reach			1664mm
Vertical Reach			2030mm
Driving capacity			7900W
Working Range	Arm	J1 (Rotation)	±170°
		J2 (Lower arm)	-70° to +60°
		J3 (Upper arm)	-140° to +240° <sup>(2)</sup>
	Wrist	J4 (Swing)	±180°
		J5 (Bending)	-50° to +230°
		J6 (Twist)	±360°
Motion speed	Arm	J1 (Rotation)	3.40 rad/s(195°/s)
		J2 (Lower arm)	3.32 rad/s(190°/s)
		J3 (Upper arm)	3.14 rad/s(180°/s)
	Wrist	J4 (Swing)	6.98 rad/s(400°/s)
		J5 (Bending)	6.98 rad/s(400°/s)
		J6 (Twist)	10.5 rad/s(600°/s)
Wrist allowable load	Allowable moment	J4 (Swing)	43.7N•m
		J5 (Bending)	43.7N•m
		J6 (Twist)	19.6N•m
	Allowable moment of inertia	J4 (Swing)	2.4lb (1.09kg)•m <sup>2</sup>
		J5 (Bending)	2.4lb (1.09kg)•m <sup>2</sup>
		J6 (Twist)	0.53lb (0.24kg)•m <sup>2</sup>
Arm cross-sectional area			10.9ft <sup>2</sup> (3.32m <sup>2</sup> )×340°
Environmental conditions			32°F to 113°F (0 to 45°C), 20 to 80% RH (no condensation)
Mass / weight			783lb (355kg)
Installation method			Floor/Ceiling
Paint color			White(Munsell 10GY9/1)

## Notes

1. Positional repeatability of the tool center point (TCP) value complies with the JIS-B-8432 Standard.
2. The working range of the J3 axis is restricted to -140 degrees to +165 degrees when floor-based welding is applied.
3. The capacity of the upper arm varies with the wrist capacity.
- 4) Regarding the specification of the operation speed, a risk assessment in the use environment is required.

## FD-A20:

- High tracking accuracy throughout the entire robot work envelope.
- High accuracy delivered in both straight-line and small-arc applications.
- The best choice for laser welding and cutting, TIG, and other tasks requiring high accuracy.

These specifications are subject to change without prior notice.

# Complete lineup of industrial robots to meet all of your factory floor applications!

- LINE LOADING
- CUTTING
- MACHINE TENDING
- WELDING
- FINISHING
- ASSEMBLY
- SHIPPING INSPECTION

## Small and Light Payload Robots

H5	866	5
B6	1445	6
B6L	2008	6
V8	1437	8
V8L	2006	8
V25	1710	25

## High Accuracy Robot

A20	1664	20
V80	9430	80
V100	9430	100
V130	9430	130

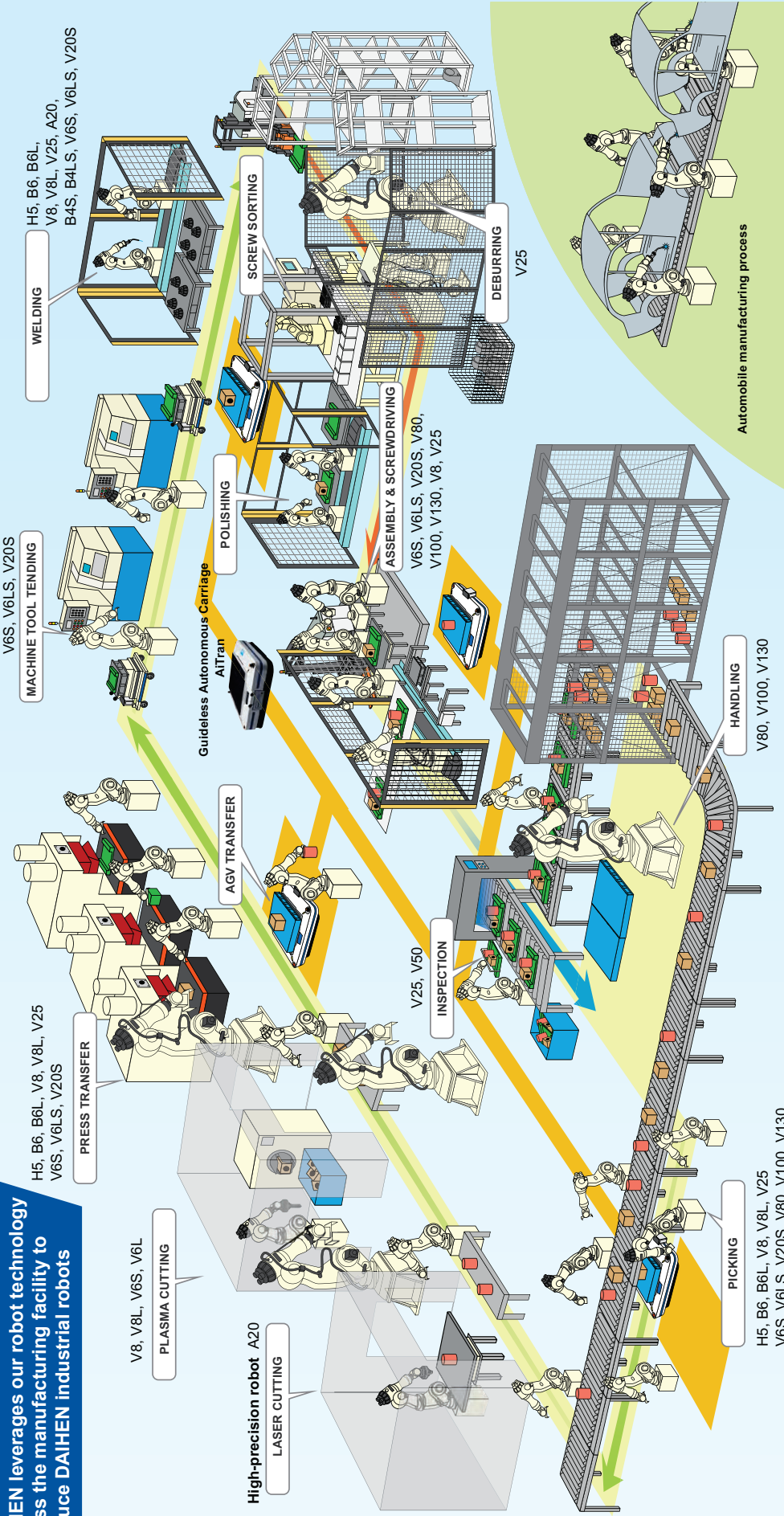
## 7-Axis Robots

B4S	1435	4
B4S	2008	4
V6S	1427	6
V6LS	2006	6
V20S	1710	20

## High Payload Robots

H5, B6, B6L, V8, V8L, V25, A20, B4S, B4LS, V6S, V6LS, V20S		
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**DAIHEN leverages our robot technology across the manufacturing facility to produce DAIHEN industrial robots**



Automobile manufacturing process

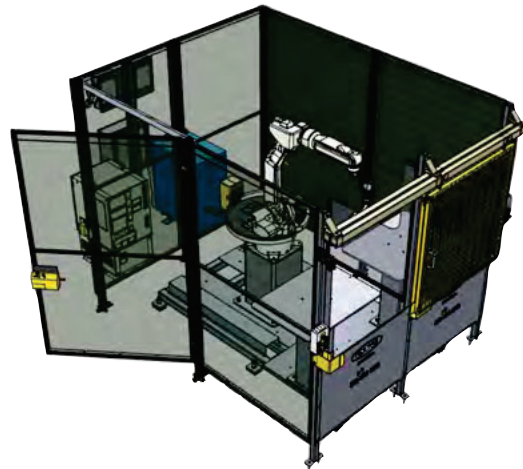
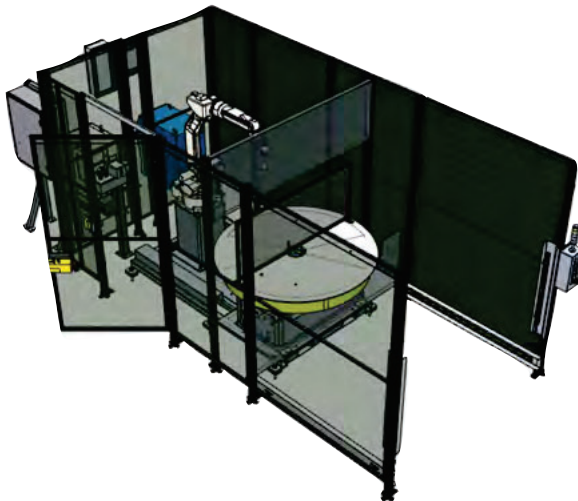
H5, B6, B6L, V8, V8L, V25  
V6S, V6LS, V20S, V80, V100, V130

**ROBOT,  
WELDING POWER  
SOURCE,  
WIRE FEEDER,  
TORCH.  
WE PROVIDE IT ALL.**

**SEAMLESS SOLUTIONS**



Our cells can provide arc welding solutions for a range of parts from small to large size, with minimal operator movement required and little to no part positioning. The compact designs reduce required manufacturing floor space. All cells include an arc welding robot, a robot controller, a teach pendant and a positioner.



**OTC DAIHEN Website**  
[www.DAIHEN-USA.com](http://www.DAIHEN-USA.com)

**NORTH AMERICA CORPORATE HEADQUARTERS**

1400 Blausler Dr, Tipp City OH 45371  
Phone: (937) 667-0800  
Fax: (937) 667-0885

**DAIHEN ROBOT Website**  
[www.DAIHEN-robot.com/en](http://www.DAIHEN-robot.com/en)

**ATLANTA TECHNICAL CENTER**

3135 Medlock Bridge Road  
Norcross, GA 30071  
Phone: 888-OTC-ROBO  
Fax: (937) 667-0885

**DETROIT TECHNICAL CENTER**

750 Welch Road  
Commerce Township, MI 48390  
Phone: 888-OTC-ROBO  
Fax: (937) 667-0885



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In accordance with DAIHEN's policy to make continuing improvements, design and/or specifications are subject to change without notice and without any obligation on the part of manufacturer.

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